

**REEXAMINATION CERTIFICATE  
ISSUED UNDER 35 U.S.C. 307**

THE PATENT IS HEREBY AMENDED AS  
INDICATED BELOW.

Matter enclosed in heavy brackets [ ] appeared in the patent, but has been deleted and is no longer a part of the patent; matter printed in italics indicates additions made to the patent.

ONLY THOSE PARAGRAPHS OF THE  
SPECIFICATION AFFECTED BY AMENDMENT  
ARE PRINTED HEREIN.

Column 2, lines 16-29:

In another embodiment of the instant invention, it has been discovered that certain halogenated N-hydrogen compounds per se also serve as outstanding slimicides for the treatment of circulating water containing organic matter such as in the pulp and paper industry. These compounds show enhanced efficacy over the hypochlorite in these applications. This result is particularly surprising since organic matter, generally over 0.2 wt. % and frequently over 0.5 wt. %, would be expected to interfere with the biocidal efficacy of such compounds. Typically, in the case of papermaking, these processing streams have from 0.2 to 3 wt. % organic matter, most frequently from 0.5 to 2 wt. %, comprised of approximately 95-99% pulp fiber as well as additional materials such as sizing resin and starch.

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims 1, 5-7, 9, 10 and 13 are cancelled.

Claims 2-4, 8, 11 and 12 are determined to be patentable as amended.

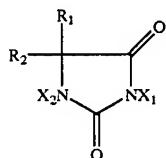
New claims 14-16 are added and determined to be patentable.

2. The [method] papermaking process of claim [1] 14 wherein [the] a mixture of the slimicide and the N-hydrogen compound is formed just prior to the addition to said circulating water [system] slurry.

3. The [method] papermaking process of claim [1] 16 wherein the slimicide is chlorine gas or sodium hypochlorite.

4. The [method] papermaking process of claim [1] 16 wherein from 0.1 to 10 ppm of active slimicide (expressed as Cl<sub>2</sub>) is maintained in the circulating water [system] slurry.

8. The [method] papermaking process of claim [1] 16 wherein said slimicide is a halogenated hydantoin of the formula:



wherein R<sub>1</sub> and R<sub>2</sub> are independently selected from the group consisting of lower alkyl having 1 to 12 carbon atoms, and wherein X<sub>1</sub> and X<sub>2</sub> are independently selected from the group consisting of bromine, chlorine and hydrogen, and at least one of X<sub>1</sub> and X<sub>2</sub> being bromine or chlorine.

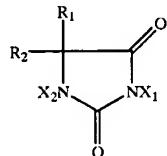
11. The [method] papermaking process of claim 8 wherein the halogenated hydantoin contains bromochlorodimethylhydantoin.

10 12. The [method] papermaking process of claim 8 wherein the halogenated hydantoin is a mixture of dichlorodimethylhydantoin and dichloroethylmethylhydantoin.

15 14. In a process for making paper from pulp fiber wherein from 0.2 to 3 weight percent of organic matter comprising from 95 to 99 weight percent pulp fiber is maintained in a circulating water slurry in the presence of sizing, the improvement of performing said process in the presence of a slimicidally effective amount of an N-hydrogen compound and a slimicide in a molar ratio of from 0.1:1 to 10:1 in said circulating water slurry; wherein said N-hydrogen compound is p-toluenesulfonamide, dimethylhydantoin, methylethylhydantoin, cyanuric acid, succinimide, urea, 4,4-dimethyl-2-oxazolidinone, or glycouril and said slimicide is chlorine gas, bromine, bromine chloride, an alkali metal or alkaline earth metal hypohalite, a halogenated hydantoin, a halogenated cyanurate, or halogenated cyanuric acid and the amount of the N-hydrogen compound present in said circulating water slurry is sufficient to enhance the biocidal efficacy of the slimicide and reduce absorbable organic halogen (AOX) by-product formation.

30 15. The papermaking process of claim 14 wherein the slurry is at a pH of from about 5.0 to about 5.5.

16. In a process for making paper from pulp fiber wherein from 0.2 to 3 weight percent of organic matter comprising from 95 to 99 weight percent pulp fiber is maintained in a circulating water slurry in the presence of sizing, the improvement of performing said process in the presence of a slimicidally effective amount of an N-hydrogen compound and a slimicide in a molar ratio of from 0.1:1 to 10:1 in said circulating water slurry; wherein said N-hydrogen compound is p-toluenesulfonamide, dimethylhydantoin, methylethylhydantoin, cyanuric acid, succinimide, urea, 4,4-dimethyl-2-oxazolidinone, or glycouril and said slimicide is a halogenated hydantoin of the formula



55 60 wherein R<sub>1</sub> and R<sub>2</sub> are independently selected from the group consisting of lower alkyl having 1 to 12 carbon atoms, wherein X<sub>1</sub> and X<sub>2</sub> are independently selected from the group consisting of bromine and chlorine, and the amount of the N-hydrogen compound present in said circulating water slurry is sufficient to enhance the biocidal efficacy of the slimicide and reduce absorbable organic halogen (AOX) by-product formation.

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